

CLAIMS

1. A two-dimensional photonic crystal slab having a three-dimensional local structure, characterized by that it comprises:

5 a) a slab-shaped body;
 b) a plurality of areas having a refractive index different from that of the body, which are periodically arranged in the body; and
 c) a refractive index member mounted on the surface of the body.

10 2. The two-dimensional photonic crystal slab having a three-dimensional local structure according to claim 1, characterized in that it comprises a waveguide formed by providing a linear defect of the modified refractive index areas in proximity to the refractive index member.

15 3. The two-dimensional photonic crystal slab having a three-dimensional local structure according to claim 1 or 2, characterized in that two or more pieces of the refractive index members differing in material, shape or size are mounted on the body.

20 4. The two-dimensional photonic crystal slab having a three-dimensional local structure according to one of claims 1-3, characterized in that a point-like defect of the modified refractive index areas are provided within the body and a refractive index member is additionally mounted at the position of the point-like defect.

25 5. The two-dimensional photonic crystal slab having a three-dimensional local structure according to claim 4, characterized in that a plurality of point-like defects of the

modified refractive index areas having different resonant wavelengths are provided within the body, and a plurality of the refractive index members identical in material, shape and size are arranged on a surface of the body at positions of the point-like defects.

5 6. The two-dimensional photonic crystal slab having a three-dimensional local structure according to one of claims 1-5, characterized in that the refractive index members are mounted on both sides of the body.

10 7. The two-dimensional photonic crystal slab having a three-dimensional local structure according to claim 6, characterized in that the refractive index members are mounted at the same position on both sides of the body.

15 8. The two-dimensional photonic crystal slab having a three-dimensional local structure according to claim 7, characterized in that identical refractive index members are mounted at the same position on both sides of the body.

9. The two-dimensional photonic crystal slab having a three-dimensional local structure according to one of claims 1-8, characterized in that it is provided with a point-like defect of the modified index areas asymmetrical between front and back sides.

20 10. The two-dimensional photonic crystal slab having a three-dimensional local structure according to one of claims 1-9, characterized in that the refractive index member is made of the same material as that of the body.

25 11. The two-dimensional photonic crystal slab having a three-dimensional local

structure according to one of claims 1-9, characterized in that the refractive index member is made of a material whose refractive index changes when the material receives an external operation.

5 12. The two-dimensional photonic crystal slab having a three-dimensional local structure according to one of claims 1-11, characterized in that the refractive index member is a cylinder whose top is concave or convex.

10 13. A method of manufacturing a two-dimensional photonic crystal slab having a three-dimensional local structure, characterized by that it comprises a process for creating a refractive index member in which a gas material used for creating a refractive index member is introduced onto a two-dimensional photonic crystal and a focused ion beam is irradiated onto the crystal to deposit the refractive index member.

15 14. A method of manufacturing a two-dimensional photonic crystal slab having a three-dimensional local structure, characterized by that it comprises a process for creating a refractive index member in which a refractive index member beforehand is mounted onto the two-dimensional photonic crystal with a nanomanipulator.

20